

Personalized Medical Oncology: It Takes a Team

Critical to Stony Brook University Cancer Center's collaborative approach to treating lung cancer is the medical oncology team, particularly the physician-scientists who have studied at both bench and bedside on how therapeutic regimens work on different patients.

The team's expertise means that each patient receives a highly individualized treatment plan that addresses the specific cancer, the patient's particular biology and physiology, and the genetic components of the cancer type.

The medical oncologist is responsible for determining the most effective chemotherapy or biological therapy for each patient and administering those treatments. Depending on the particular cell type and stage of disease, patients with lung cancer may receive these therapies before or after treatments such as surgery and radiation, or alone.

"At Stony Brook, we strive to reduce or eliminate unpleasant effects of treatments," said Roger Keresztes, MD, a medical oncologist at the Cancer Center. "For example, if one medication has undesirable side effects for the patient, we work to find an alternate medication that is easier to tolerate but no less effective."

The increasing availability and efficacy of biological therapies to treat advanced lung cancers are of particular interest at Stony Brook.

"This is a rapidly expanding field," said Dr. Keresztes. "These targeted, injectable therapies disrupt the growth of malignant cells. We see a lot of promise here as the knowledge increases."

Dr. Keresztes and his colleagues have been working to expand their understanding of the biology of lung cancers and immune regulators. Clinical trials have been examining and evaluating new agents for use in chemotherapy and biological therapy.

In fact, the entire landscape for treating lung cancer is changing very quickly. The number of drugs approved by the FDA over the past 10 years has tripled, and a dozen or so new drugs are expected to be approved in the next couple of years. Some of these are designed to treat cancers with specific genetic mutations or resistance to currently available regimens.

One new treatment protocol that is being watched carefully by cancer specialists is an antibody therapy called "immune checkpoint blockade." This therapy blocks cancer cells from setting up an "immune checkpoint" that suppresses the body's immune response.

Whether through research initiatives or clinical care, the focus is always on each patient's unique medical needs and reaching an optimal outcome.

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Defeating the Deadliest Cancer with New Screening

Lung cancer has long been defined as the deadliest cancer, claiming more lives than breast, colon and prostate cancers combined. Those affected by the other cancers listed have been encouraged with marked improvements in survival rates, while significant progress has been limited for lung cancer. However, with new screening guidelines in place, the time has come for those who are at risk for lung cancer to have hope, as well. The outlook is optimistic: Studies show that when detected early, patients with lung cancer can now have a 90 percent survival rate.

In the past, the five-year survival rate for lung cancer has been just 16 percent. This is directly related to late-stage disease diagnosis in the majority of cases. Because the lungs are not innervated, lung cancer tends to grow and progress without causing any symptoms. However, with the introduction of new screening guidelines targeting long-term, heavy smokers who are at highest risk for lung cancer, these statistics may start to improve.

William Moore, MD, Co-Director, Center for Lung Cancer Screening and Prevention, and a board-certified thoracic radiologist, explained, "Screening for lung cancer with a low-dose chest CT scan has saved many lives due to early detection. In addition, screening has lowered disease burden in dozens of others who have decreased or quit smoking as a result of the screening program."

"At Stony Brook University Cancer Center, we are taking an aggressive, multifaceted approach to screening patients who are high risk," said Barbara Nemesure, PhD, Director, Cancer Prevention and Control Program at the Cancer Center. This approach includes an annual low-dose radiation computed tomography (CT) chest scan, a physical examination, smoking cessation programs and long-term patient follow-up. In fact, one of the goals is to encourage patients to become ex-smokers by their next visit.

Stony Brook's Program is available for those who are current or former smokers and:

- Are 50 to 80 years of age
- Have smoked a pack of cigarettes a day for 30 years or two packs a day for 15 years
- Or, who have quit a heavy smoking habit within the past 15 years

Dr. Nemesure added, "We welcome any individual who may be at high risk to inquire about the program. This includes those who have quit smoking within the past 15 years or individuals who may have been exposed to hazardous environmental or chemical irritants, including those who worked at Ground Zero."

If someone is unsure if they qualify, call April Plank, DNP, Co-Director, Center for Lung Cancer Screening and Prevention, at (631) 638-7000. One barrier to screening has typically been resistance or anxiety by patients when they have no symptoms. "It is important to educate our community that screening works, and it can save lives," said Dr. Plank. "Part of my role is to educate our patients, offer reassurance and guide our patients through the process."

Outcomes prove value

More than 350 patients have been screened since the program's inception in 2013 and five cases of lung cancer were detected in patients who were otherwise asymptomatic. All underwent surgery at Stony Brook University Hospital. These patients have been given a good prognosis for survival due to the early detection of lung cancer by the screening program.

For more information, call (631) 638-7000.

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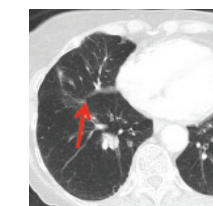
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Case Study: Patient Treated with SBRT



STAGE I LUNG CANCER



AFTER 3 MONTHS



AFTER 2 YEARS

This stage I lung cancer was treated with stereotactic body radiation therapy (SBRT), which included four sessions of focused radiation beams. The tumor disappeared completely in three months. There is no sign of tumor recurrence two years after treatment was completed.



Message From the Deputy Director

Samuel Ryu, MD
Deputy Director, Clinical Affairs
Stony Brook University Cancer Center

We are privileged to serve more than 3,000 new cancer cases every year at Stony Brook University Cancer Center. Nothing is ever static here. We are always moving forward — with new programs, new technology and new talent — all to benefit our patients.

Some of our progress is quite visible. You may have seen the evolution of the Medical and Research Translation (MART) building as you drive along Nicolls Road or when you are on campus. While we all eagerly await the opening of the MART next year, our focus remains on caring for our current patients.

One of our key areas of concentration is the early diagnosis of cancer through various screening programs. In this issue, the Lung Cancer Screening Program is featured. This program has been successfully launched, using a computed tomography (CT) scan, even prior to Medicare approval. When the tumor is detected early, curative treatment options are available with either conventional or contemporary high-technology therapy for a potential cure. These advanced multidisciplinary treatments are being performed by our specialists with disease-specific expertise for personalized care.

Additional articles highlight treatment programs for early-stage lung cancer and the collaborative efforts in clinical care and research for lung cancer. I am proud to note that our experts on the lung cancer team are pioneers in developing these programs through research and education.

I would like to extend a personal invitation to contact me to discuss any aspect of our cancer program. We continue to find new opportunities for basic and translational research with clinical trials for tomorrow's cancer care. We look forward to partnering with you to benefit our patients and community.

Did You Know?

According to the American Lung Association, nonsmokers have a 20 to 30 percent greater chance of developing lung cancer if they are exposed to secondhand smoke at home or work.

Treatment Options for Early-Stage Lung Cancer at Stony Brook Cancer Center

About 85 percent of lung cancers are non-small cell lung cancer (NSCLC) and the rest are small-cell lung cancer (SCLC). Surgery generally plays a secondary role for SCLC, but it is considered the most effective treatment for early-stage NSCLC, called IA and IB. Treatment options include surgery, cryoablation and radiosurgery depending on the size and location of the tumor and the patient's condition.

Surgical Options

For patients with stage I NSCLC whose health — including cardiovascular and respiratory function — makes them good surgical candidates, surgery can achieve five-year cancer-free survival rates upward of 80 percent. Extensive preoperative testing identifies patients healthy enough for surgery.

Stony Brook University Cancer Center has three thoracic surgeons who are experienced with advanced surgical technology in cardiothoracic surgery and lung cancer. They are experts in several types of lung cancer surgery.

Lobectomy — the gold standard

The surgical procedure most often performed for lung cancer is a lobectomy. Lungs have five lobes, three in the right lung and two in the left. With a lobectomy, the entire lobe that contains cancer is removed. A lobectomy is currently considered the standard of care supported by national guidelines.

“A lobectomy is the gold standard for early-stage lung cancer surgery,” said cardiothoracic surgeon Thomas Bilfinger, MD, Professor, Department of Surgery, and Director, Lung Cancer Evaluation Center. “It provides the best chance of a cure because it removes the entire tumor. Most patients have good lung function even after a lobe has been removed.”

A lobectomy is traditionally performed through an incision called a thoracotomy, which involves cutting through the chest wall between the ribs. This provides the surgeon with access

to the lung, so the diseased area can be removed. Over the years these incisions have become smaller and smaller.

Stony Brook surgeons have performed more than 1,000 lobectomies in the past 10 years. “Our success rate is very favorable,” noted Dr. Bilfinger. “After five years, more than 80 percent of our patients with stage I lung cancer are still living, and many are leading full, active lives.”

Minimally invasive surgical techniques

If appropriate for the patient and tumor location, physicians at Stony Brook may use minimally invasive techniques instead of a thoracotomy. These include video-assisted thoracic surgery (VATS) or the newest, technologically advanced robotic-assisted surgery. The same amount of lung is removed with these surgeries, but they usually require three holes or small incisions, which may mean faster recovery times for patients compared to the more traditional thoracotomy.

Research explores alternate method

Ongoing research is examining whether, for certain types of cancer, removal of less than a lobe can achieve results similar to a lobectomy. One procedure being studied is the wedge resection, which removes a well-defined area of lung that is without anatomic borders. These procedures have long been used in patients who are unable to tolerate a full lobectomy. Stony Brook is actively involved in research to determine if these procedures are equal to full lobectomies in otherwise healthy people. ■

Cryoablation

Cryoablation, or the use of cold temperatures to kill cancer cells, is offered at only a few medical centers in the world for the treatment of lung cancer, and Stony Brook Medicine is one of them. In fact, during the past eight years, patients have traveled from across the country to Stony Brook for treatment. In addition, Stony Brook is home to the single largest study in the world on the use of this technology for non-small cell lung cancer. To date, the study outcomes show a five-year survival rate of nearly 70 percent. This is quite promising, considering that these patients had severely compromised lung function and were deemed medically inoperable.

“Cold ablation is still a young technology, but it offers many possibilities,” said William Moore, MD, Chief, Thoracic Imaging and Intervention at Stony Brook Medicine. “Most ablative therapy, such as stereotactic body radiation therapy, or SBRT, uses a heat-based source to target and eradicate tumors. However, SBRT can only be used once, whereas cold-based treatments can be used repeatedly and indefinitely. It is a fairly safe procedure that delivers minimal damage to surrounding tissue. It also can be combined with other treatments for maximum effect.”

How does it work? While a patient is under sedation, the physician inserts a probe directly into the lung tumors. The probe is chilled to

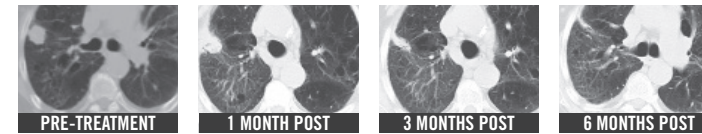
minus 150 to 160 degrees centigrade, which bursts and kills the targeted cells. The cells are absorbed by the body or turned into scar tissue. Average patient length of stay is 1.6 days and the median is 1.1 days, and recovery time following is fairly quick.

One of the great advantages of the procedure is that it can be used for patients who might

be at too high risk for lung surgery because of other medical conditions. It also can be used to treat both primary and metastatic disease. Dr. Moore added, “Our goal with cryoablation is a cure, not palliative measures.” Over the past eight years, Stony Brook has treated more than 250 patients with cryoablation. ■

Case Study

A female patient in her early 70s was found to have a right upper lobe 2.0 cm nodule and a biopsy revealed adenocarcinoma. Cryoablation was performed to this lesion in 2008. The tumor was completely treated with cryotherapy without evidence of recurrence several years after treatment.



Stereotactic Radiotherapy

Another viable option at the Stony Brook University Cancer Center for patients with lung cancer is stereotactic radiotherapy. Unlike cryoablation, which relies on extreme cold to kill cancer cells, radiosurgery — also known as stereotactic body radiation therapy (SBRT) — uses high-dose radiation to destroy tumors. In contrast to conventional radiation treatments, higher doses of radiation are given over a shorter period of time, increasing the potency of the radiation and convenience of treatment for patients.

This is made possible by the state-of-the-art facilities and experienced staff at Stony Brook's Department of Radiation Oncology. Stony Brook was the first hospital on Long Island to offer SBRT treatment, beginning in 2007, shortly after SBRT was first approved for use in the country. As accredited members of national multidisciplinary collaborative thoracic oncology groups, Stony Brook continues to follow established guidelines in order to provide convenient and safe treatment for patients.

SBRT can be delivered in lieu of surgery in eligible patients, with clinical trials showing equivalent outcomes to surgery for early-stage lung cancer. In other cases, SBRT can be delivered in conjunction with surgery or chemotherapy to work synergistically with other modalities of treatment. It can help prevent more complicated surgeries, as well as preserve function, and help better manage

For more information, call the Department of Radiation Oncology at (631) 444-2200 or 444-2210.

symptoms and improve outcomes. It can also be used on benign tumors to help preserve patient function.

“One of the most important benefits of SBRT,” explained Hannah Yoon, MD, Assistant Professor and Radiation Oncologist, Department of Radiation Oncology, “is the submillimeter precision in radiation delivery, which spares damage to surrounding normal and healthy tissue.” This is because the radiation beam is guided by advanced imaging techniques so that the tumor can be precisely visualized and targeted. It involves no incision, no anesthesia and can be performed on an outpatient basis.

“As a result,” added Dr. Yoon, “with this virtual surgery you rarely see side effects.” Patients experience less toxicity from treatments that sometimes occur after more conventional and diffusely distributed standard radiotherapy treatments.

At the Cancer Center, a highly specialized radiosurgery and stereotactic radiotherapy team, led by Samuel Ryu, MD, Professor and Chair, Department of Radiation Oncology, routinely uses SBRT for tumors in the spine, brain, lung, liver, adrenal glands and pancreas, as well as for palliative care — treating more than 300 patients annually.

As the premier academic medical center on Long Island, Stony Brook Medicine continues to conduct research and offer patients enrollment in national clinical trials. ■

Focus On Clinical Trials and Research



Strategic and Collaborative Approach to Research

It couldn't be a more exciting time to be involved in cancer research for John Haley, PhD, Director of Developmental Therapeutics at Stony Brook University Cancer Center.

Before coming to Stony Brook Medicine in 2014, Dr. Haley was involved in the discovery and development of a drug called erlotinib, or Tarceva®, which has become a valuable addition in the treatment of non-small cell lung cancer for patients with a mutation in a gene called epidermal growth factor receptor (EGFR).

At Stony Brook, he is taking it a step further by working on uncovering the molecular resistance mechanisms to this class of drugs that occurs in some individuals.

In looking at how to design a strategy to minimize resistance to this treatment approach, Dr. Haley and his team, which includes pharmacology, pathology and life sciences groups, are examining several factors:

- The process by which these cells transform and become more aggressive with properties of cancer stem cells
- The way in which the cells have changed in order to find a means to destroy them after they mutated
- How the wiring inside the tumor cells vary among patients
- How the immune system recognizes and fights these mutated cells
- What the drug targets already identified have in common

“We are able to take such a comprehensive approach because of the collaborative way Stony Brook handles research,” said Dr. Haley. “Departments are no longer in silos. As an academic medical center, we bring people together with common interests but different skill sets and disparate backgrounds. This allows us to deal with a problem in a much broader and flexible way.”

Dr. Haley also acknowledged the multiple benefits of conducting research this way. “Beyond the melding of the broad skill sets toward a common goal, this approach offers more funding opportunities and helps speed the process from bench to bedside.”